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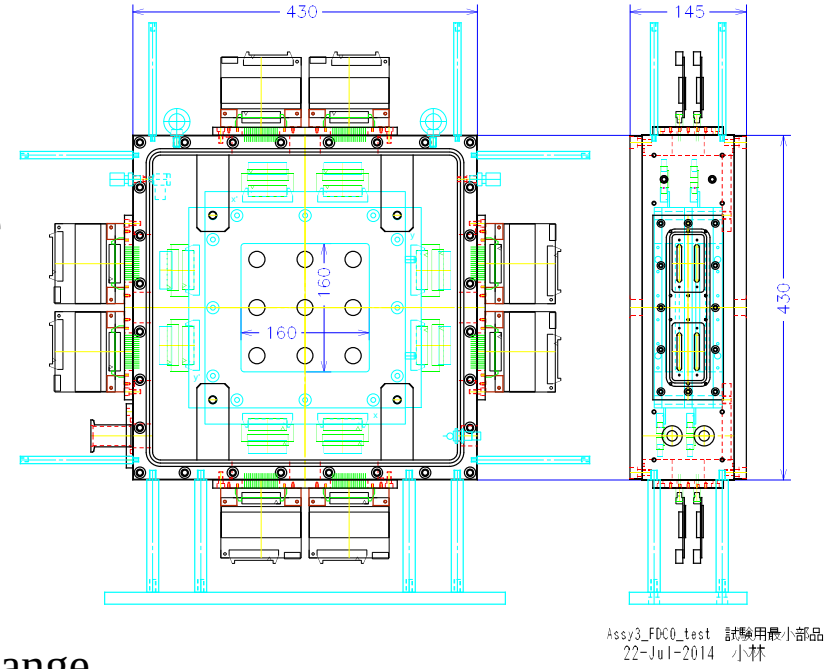
Memo on FDC0 & KDC240

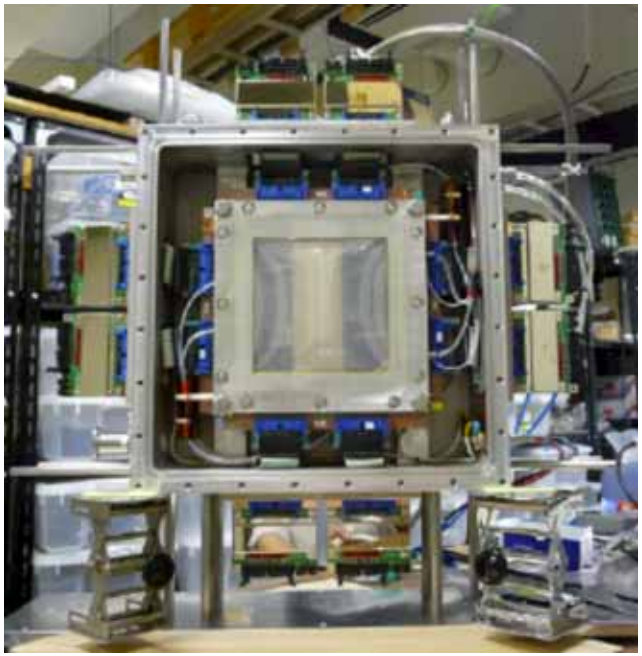
- FDC0
  - narrow-cell drift chamber in low-pressure box
  - bench test using β rays
    - i-C_4H_{10} @P=50, 75, 100 torr
    - P10, He+60%CH_4 @P= 1 atm
- KDC240
  - cathode-readout drift chamber in low-pressure box, 2 sets
  - bench test using β rays
    - i-C_4H_{10} @P=100 torr

FDC0 Assembly

- location: between target & FDC1
- narrow-cell drift chamber in low-pressure box
  - drift distance= 2.5 mm, half gap= 2.5 mm
    - same structure as BDC1 & BDC2, for high-rate
  - effective area: 160 mm x 160 mm
  - configuration: xx'yy'xx'yy'
  - #readout channels : 256 ch (32ch/plane x8)
  - gas : i-C_4H_{10} , P= 20~200 torr
  - HV : cathode (-), potential (-)
- assembly : finished



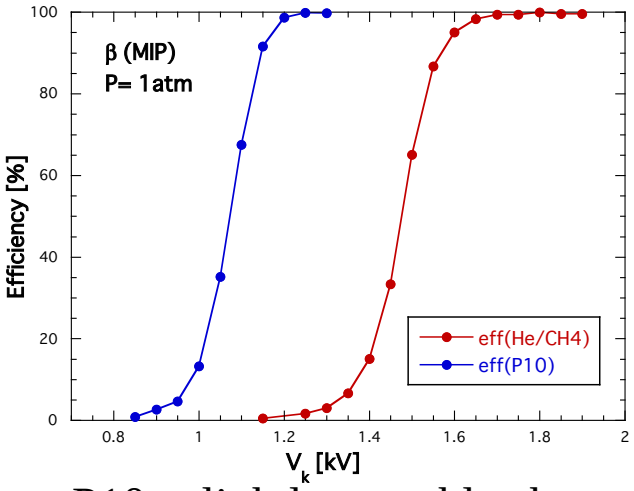
drift chamber in low-pressure box



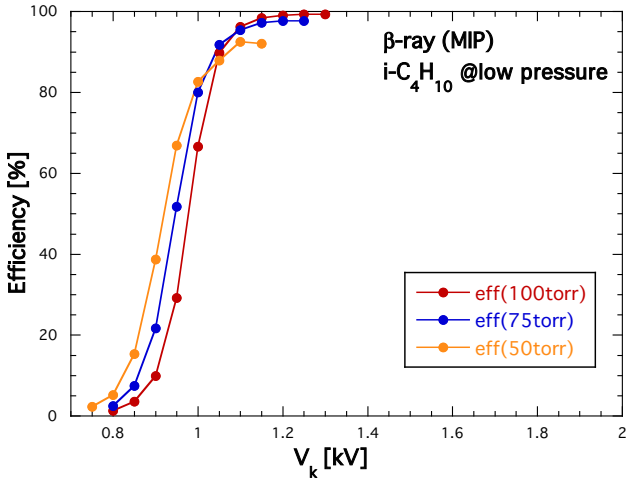
with test flange

FDC0 bench test

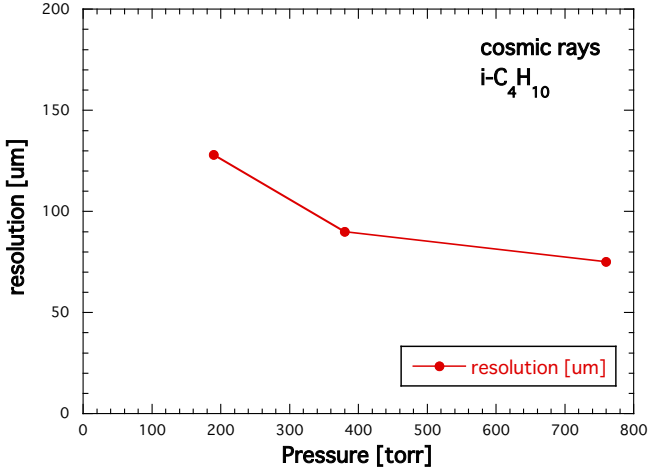
- Efficiency test using β-rays (MIP) : ΔV= 50 V, V_{th}= -0.4 V
  - atmospheric pressure :
    - P10 & He+60%CH_4



    - P10 : slightly unstable above 1.35 kV
  - low pressure :
    - i-C_4H_{10} (P=50, 75, 100 torr)

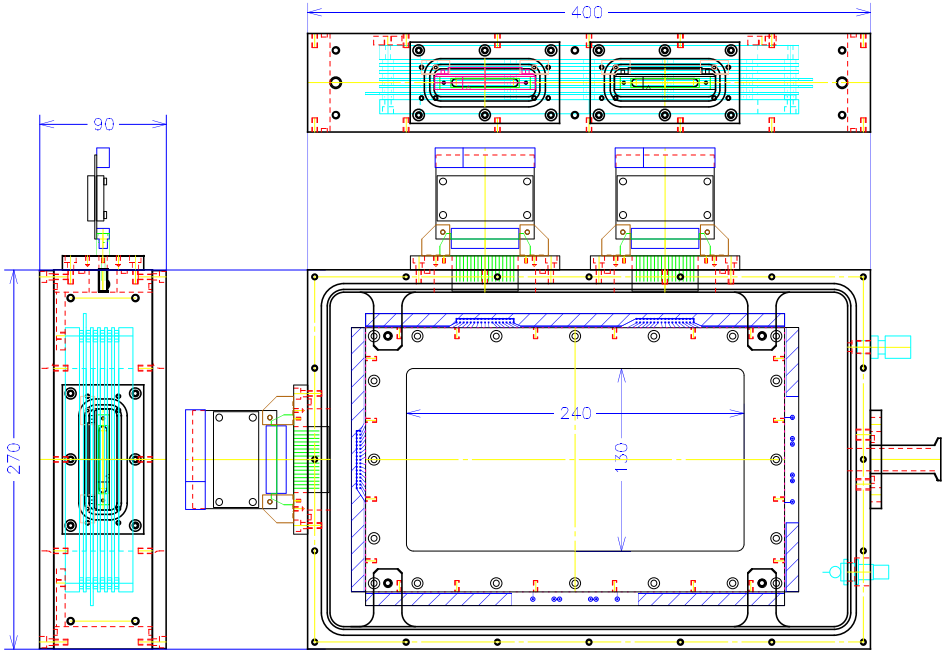


    - ε ≧ 99% for MIP @P= 100 torr
- Pattern test
  - one channel with low-efficiency : to be fixed
- Position resolution in low pressure operation
  - HI : expected to be identical to BDC1 & BDC2
  - MIP : old bench test data with different ASD →



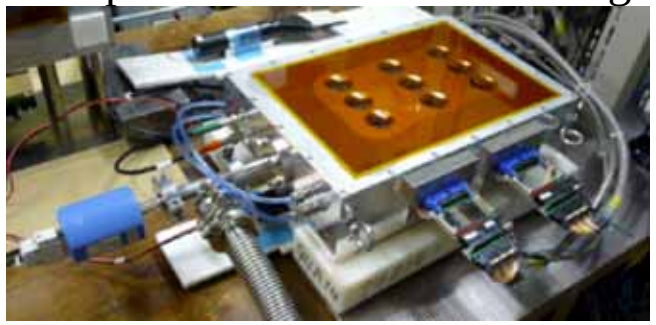
KDC240 Assembly

- purpose
  - beam monitor at F5, F7 etc.
  - for lower-Z beams, moderate rate, moderate #readout channels
- cathode-readout drift chamber (KDC) in low-pressure box
  - effective area : 240 mm x 130 mm
  - drift distance= 5 mm, half gap= 5 (5.5) mm, cathode strip pitch= 8 mm
  - configuration : cathode_x, anode_y, cathode_com, anode_x, cathode_y
  - readout : cathode_x : 32ch, cathode-y : 16ch
  - HV : anode (+), potential (-)
  - ASD (x3) in vacuum
  - gas : i-C_4H_{10} at low pressure
- assembly (2 sets) finished



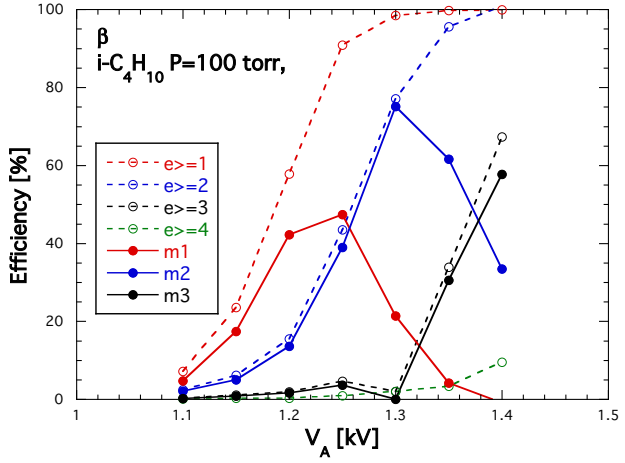
KDC240 in low-pressure box

low-pressure box with test flange



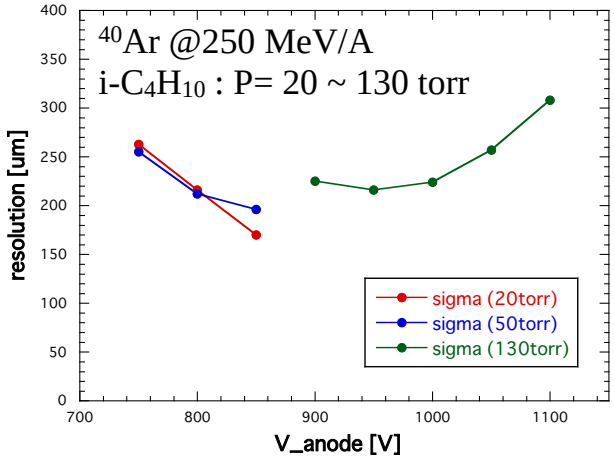
KDC240 bench test

- Efficiency test using β-rays (MIP)
  - efficiency (cluster size ≧ 3) ~ 70% for MIP @P(i-C_4H_{10})=100 torr
    - higher pressure is probably necessary to get full efficiency for MIP
    - (limited by gas handling system : P_{max}=100 torr)
  - maximum applicable voltage ~ 1.4kV due to spark
    - additional guard structure may be necessary for stable operation at higher voltage



- Position resolution
  - old beam test data

    using smaller prototype (100mm x100mm)



Misc.

- FDC0
  - for Sakaguchi exp.
    - location : between polarized magnet and FDC1
    - operation at 1 atm : He+60%CH_4 or P10
    - need
      - window flanges for 1 atm
      - platform (stand)
      - cables
- KDC240
  - additional guard structure
  - try to get resolution data using cosmic rays
    - may be difficult with reference chambers
  - beam test ?